FCC TEST REPORT

UNDER

FCC 15 Subpart C, Paragraph 15.231

PREPARED FOR：

Carrin Electronics Co., Ltd.

Unit 1308, Tower A, Regent Centre, 63 Wo Yi Hop Road,
Kwai Chung, N.T., Hong Kong

FCC ID: Q9E-91465
EUT: Wireless Thermometer
Model: #91465

June 20, 2003

Report Type: Original Report
Test Engineer: Peter Lin
Test Date: June 18, 2003
Review By: Apollo Liu

PREPARED BY：

Shenzhen Academy of Metrology & Quality Inspection

Longzhu Road, Nanshan

FCC Registration Number: 97379

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1. Summary of Test Results

The EUT has been tested according to the following specifications:

Standard	Test Type	Result	Notes
FCC Part 15, Paragraph 15.207	Conducted Test	**N/A**	Owing to the DC operation of EUT, this test item is not performed.
FCC Part 15 Subpart C Paragraph 15.231(e) Limit	Field Strength of Fundamental	**PASS**	Minimum passing margin is -0.9 dB at 433.877 MHz Horizontal
FCC Part 15, Subpart C Paragraph 15.231(e) Limit & Paragraph 15.209	Radiated Test	**PASS**	Meets Class B Limit Minimum passing margin is –9.7 dB at 867.754 MHz Horizontal
FCC Part 15 Subpart C Paragraph 15.231Limit	Measured Bandwidth	**PASS**	Complies.

2. Test Statement

2. 1 Test Statement

A. This statement explains the test condition of this project. The EUT was tested under the condition of each test item.

B. The data shown in this report reflects the worst – case data for the condition as the summary of test result.

C. EUT conditions.

Note: (1)The EUT is a Wireless Thermometer intends to use in temperature monitor or related application. Frequency Range: 433.92MHz; Batteries: 2 x AAA 1.5V Batteries.
(2)Regarding to the frequency band operation, one channel (Channel 1) were selected to perform the test, then shown on this report.
(3) It is acknowledged by Carrin Electronics Co., Ltd. that Selling Model No.: #91465.

2. 2 Departure From Document Policies, Procedure or Specifications, The Statement

1. Did have Any departure from document policies & procedures or from specifications.
   Yes ___ , No □
   If yes , the description as below.

2. The report must not be used by the client to claim product endorsement by any agency the government.

3. This product is a test sample that was shown as the photos of this test report only.

4. The effect that the results relate only to the items tested.

3. EUT Modifications

No modification by Shenzhen Academy of Metrology & Quality Inspection.

4. Conducted Power Line Test

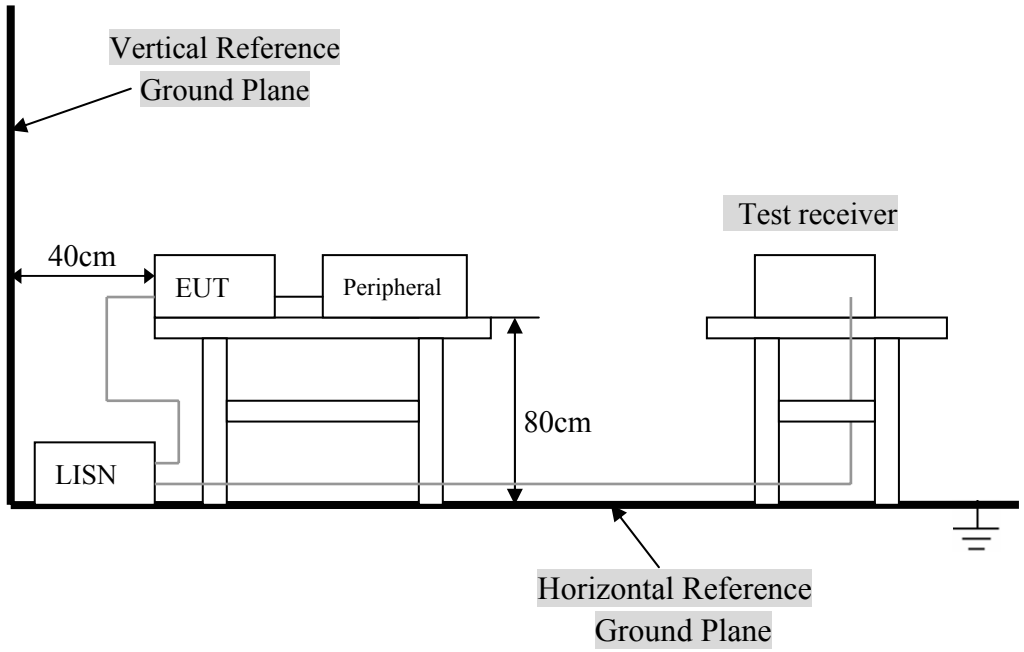
4. 1 Test Equipment

Please refer to Section 9 this report.

4. 2 Test Procedure

The EUT was tested according to ANSI C63.4 - 1992. The frequency spectrum from 0.15 MHz to 30 MHz was investigated. The LISN used was 50 ohm / 50 uHenry as specified by section 5.1 of ANSI C63.4 - 1992. cables and peripherals were moved to find the maximum emission levels for each frequency.

4. 3 Test Setup



For the actual test configuration, Please refer to the related items – Photos of Testing.

4. 4 Configuration of The EUT

The EUT was configured according to ANSI C63.4-1992. EUT was used 2 x AAA 1.5V batteries. Press any key of the EUT. Once the button releasing, the transmission will be stopped within 1 second. The EUT transmitted continuously and the duty cycle of transmitting was set to worst case condition (100% duty cycle), which provided by manufacturer during all the tests. All interface ports were connected to the appropriate peripherals. All peripherals and cables are listed below.

A. EUT

DEVICE	MANUFACTURER	MODEL #	FCC ID
Wireless Thermometer	Carrin Electronics Co., Ltd.	#91465	Q9E-91465

B. Internal Devices

DEVICE	MANUFACTURER	MODEL #	FCCID / DoC
N/A			

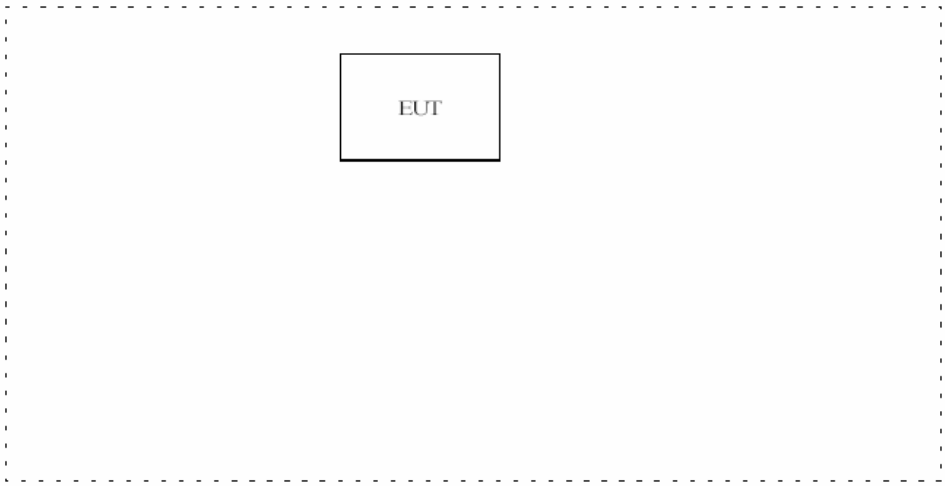
C. Peripherals

DEVICE	MANUFAC-TURER	MODEL # SERIAL #	FCC ID/ DoC	CABLE
N/A				

4. 5 EUT Operating Condition

Operating condition is according to ANSI C63.4 - 1992.

A. Setup the EUT and simulators as shown on follow.
B. Enable RF signal and confirm EUT active.
C. Modulate output capacity of EUT up to specification.



4. 6 Conducted Power Line Emission Limits

FCC Part 15 Paragraph 15.207 (dBuV)		
FREQUENCY RANGE (MHz)	**CLASS A QP/AV**	**CLASS B QP/AV**
0.15 – 0.5	79/66	66-56/56-46
0.5 – 5.0	73/60	56/46
5.0 - 30	73/60	60/50

NOTE ：In the above table, the tighter limit applies at the band edges.

4. 7 Conducted Power Line Test Result

Owing to the DC operation of EUT, this test item is not performed.

5. Radiated Emission Test

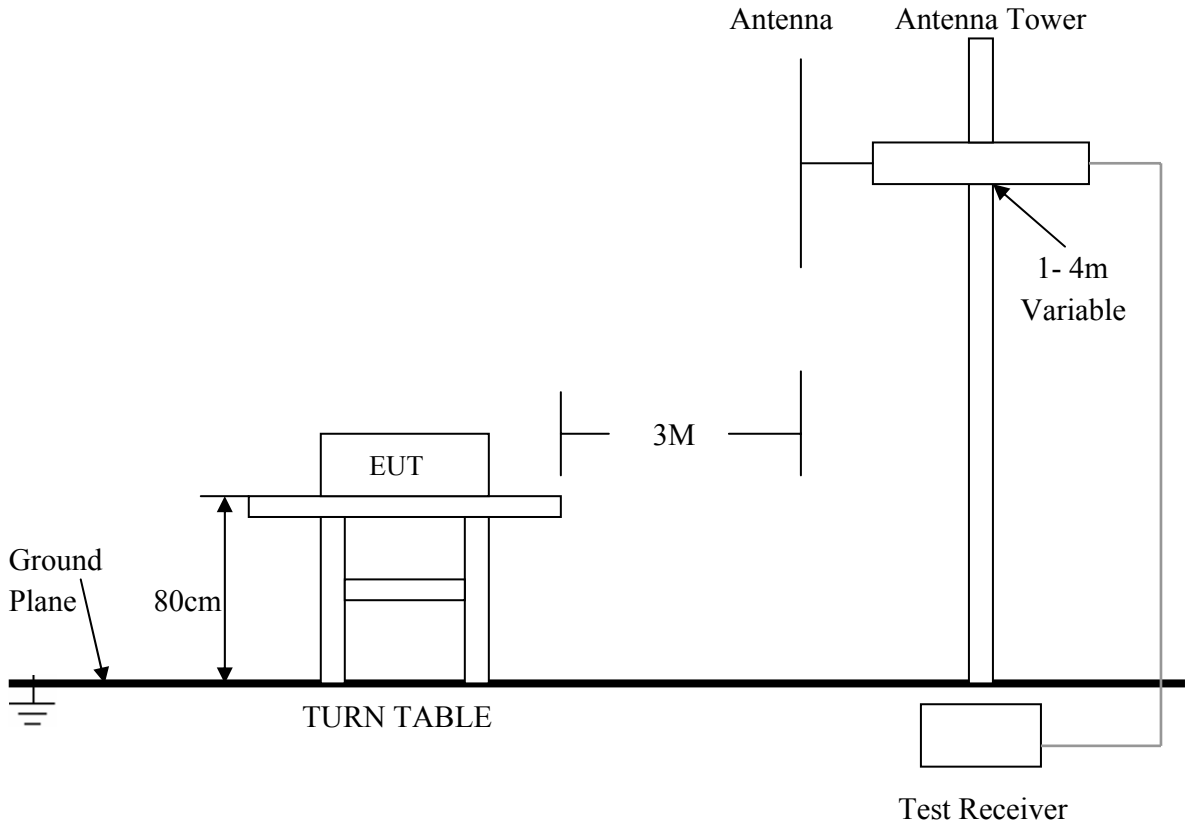
5. 1 Test Equipment

Please refer to Section 9 this report.

5. 2 Test Procedure

1. The EUT was tested according to ANSI C63.4 - 1992. The radiated test was performed at Shenzhen Academy of Metrology and Quality Inspection. This site is on file with the FCC laboratory division, Registration No. 97379.
2. The EUT, peripherals were put on the turntable which table size is 1m x 1.5 m, table high 0.8 m. All set up is according to ANSI C63.4-1992.
3. The frequency spectrum from 30 MHz to 1 GHz was investigated. All readings from 30 MHz to 1 GHz are quasi-peak values with a resolution bandwidth of 120 KHz. All readings are above 1 GHz , peak values with a resolution bandwidth of 1 MHz . Measurements were made at 3 meters.
4. The antenna high is varied from 1 m to 4 m high to find the maximum emission for each frequency.
5. Maximizing procedure was performed on the six (6) highest emissions to ensure EUT compliance is with all installation combinations. All data was recorded in the peak detection mode. Quasi-peak readings was performed only when an emission was found to be marginal (within -4 dB of specification limit), and are distinguished with a "**QP**" in the data table.
6. The antenna polarization : Vertical polarization and Horizontal polarization.

5. 3 Radiated Test Setup



For the actual test configuration , please refer to the related items – Photos of Testing.

5. 4 Configuration of The EUT

Same as section 4 . 4 of this report

5. 5 EUT Operating Condition

Same as section 4 . 5 of this report.

5. 6 Radiated Emission Limit

All emission from a digital device, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strength specified below ：

A. FCC Part 15 Subpart C Paragraph 15.231(e) Limit

Fundamental Frequency (MHz)	Field Strength of Fundamental (3m)		Field Strength of Harmonics (3m)	
	uV/m	dBuV/m	uV/m	dBuV/m
433.92	4398.7	72.8	439.9	52.9

Note:
(1) RF Voltage (dBuV) = 20 log RF Voltage (uV)
(2) Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.
(3) The emission limit in this paragraph is based on measurement instrumentation employing an average detector. Measurement using instrumentation with a peak detector function, corresponding to 20dB above the maximum permitted average limit.

B. Frequencies in restricted band are complied to limit on Paragraph 15.209.

Frequency (MHz)	Distance (m)	Field Strength (dBuV/m)
30 - 88	3	40.0
88 - 216	3	43.5
216 - 960	3	46.0
ABOVE 960	3	54.0

Note:
(1) RF Voltage (dBuV) = 20 log RF Voltage (uV)
(2) In the Above Table, the tighter limit applies at the band edges.
(3) Distance refers to the distance in meters between the measuring instrument antenna and the

5. 7 Radiated Emission Test Result

A. Fundamental Radiated Emission Data

Product : Wireless Thermometer
Test Item : Fundamental Radiated Emission Data
Test Voltage : DC 3V (Power by Battery)
Test Mode : Normal
Temperature : 25 ℃
Humidity : 56%RH
Test Result : PASS

FREQ. (MHz)	EMISSION (dBuV/m)	HORIZ /VERT	LIMITS (dBuV/m)	MARGIN (dB)
433.877	71.9	HORIZ	72.8	-0.9
433.877	62.2	VERT	72.8	-10.6

Note: (1) All Readings are Peak value.
(2) Emission Level = Reading Level + Probe Factor + Cable Loss.
(3) The average measurement was not performed when the peak measured data under the limit of average detection.

B. General Radiated Emission Data & Harmonics Radiated Emission Data

Product : Wireless Thermometer
Test Item : General Radiated Emission Data & Harmonics Radiated Emission Data
Test Voltage : DC 3V (Power by Battery)
Test Mode : Normal
Temperature : 25 ℃
Humidity : 56%RH
Test Result : PASS

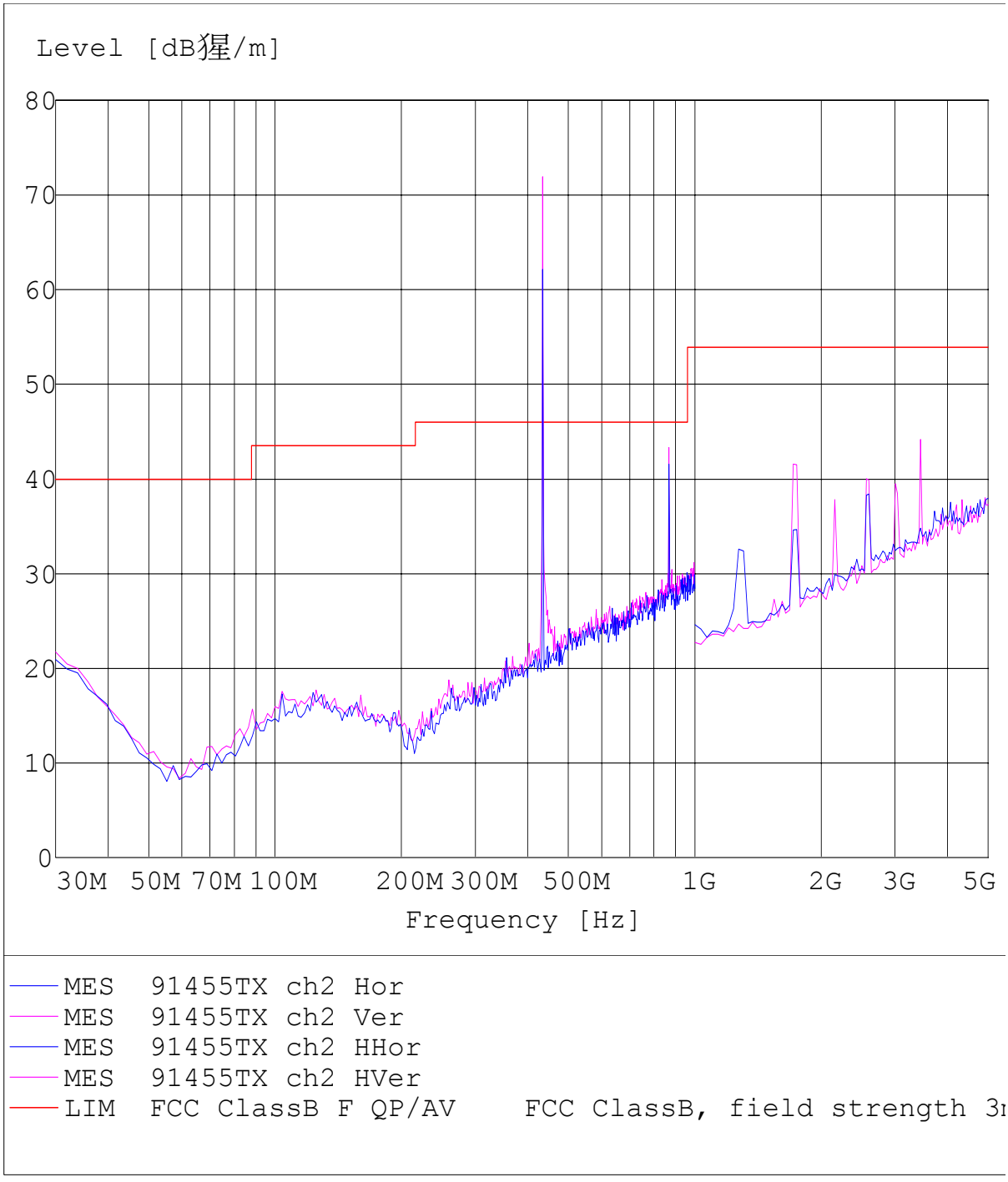
FREQ. (MHz)	EMISSION (dBuV)	HORIZ / VERT	LIMITS (dBuV/m)	MARGIN (dB)
31.269	20.6	HORIZ	40.0	-19.4
31.269	18.2	VERT	40.0	-21.8
867.754	43.2	HORIZ	52.9	-9.7
867.754	41.3	VERT	52.9	-11.6
1734.000	20.5	HORZ	52.9	-32.4
1734.000	13.5	VERT	52.9	-39.4
2610.000	16.5	HORZ	52.9	-36.4
2610.000	15.6	VERT	52.9	-37.3

Note: (1) All Reading Levels below 1GHz are Quasi-Peak, above are peak and average value.
(2) Emission Level = Reading Level + Probe Factor + Cable Loss.

Radiated Disturbance

FCC15

EUT: Wireless Thermometer M/N: #91465
Manufacturer: Carrin Electronics Co., Ltd.
Operating Condition: Normal
Test Site: SMQ EMC Laboratory, SAC
Operator: Peter Lin
Test Specification: Vertical & Horizontal
Comment:



6. Band Edge

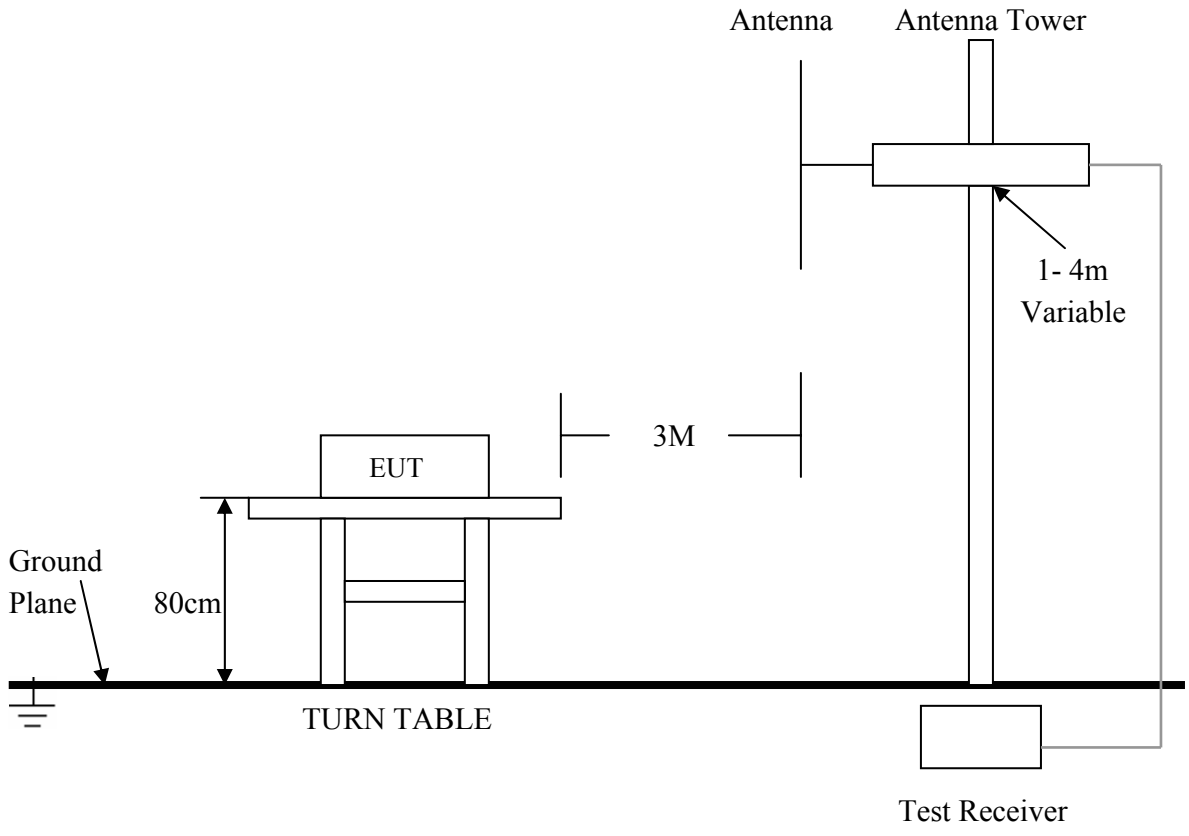
6. 1 Test Equipment

Please refer to Section 9 this report.

6. 2 Test Procedure

1. The EUT was tested according to ANSI C63.4 - 1992. The radiated test was performed at Shenzhen Academy of Metrology & Quality Inspection. This site is on file with the FCC laboratory division, reference 97379.
2. The EUT, peripherals were put on the turntable which table size is 1m x 1.5 m, table high 0.8 m. All set up is according to ANSI C63.4-1992.
3. The frequency spectrum from 30 MHz to 1 GHz was investigated. All readings from 30 MHz to 1 GHz are quasi-peak values with a resolution bandwidth of 120 KHz. All readings are above 1 GHz , peak values with a resolution bandwidth of 1 MHz . Measurements were made at 3 meters.
4. The antenna high were varied from 1 m to 4 m high to find the maximum emission for each frequency.
5. The additional latch filter below 1GHz was used to measure the level of harmonics radiated emission during field strength of harmonics measurement. The bandwidth below 30MHz setting on the field strength meter is 10 kHz, above 1GHz are 1 MHz.
6. Maximizing procedure was performed on the highest emissions to ensure EUT compliance is with all installation combinations. All data was recorded in the peak detection mode. Quasi-peak readings was performed only when an emission was found to be marginal (within -4 dB of specification limit), and are distinguished with a "**QP**" in the data table.
7. The antenna polarization ： Vertical polarization and horizontal polarization.

6. 3 Radiated Test Setup



For the actual test configuration , please refer to the related items – Photos of Testing

6. 4 Configuration of The EUT

Same as section 4 . 4 of this report

6. 5 EUT Operating Condition

Same as section 4 . 5 of this report.

6. 6 Band Edge FCC 15.231 Limit

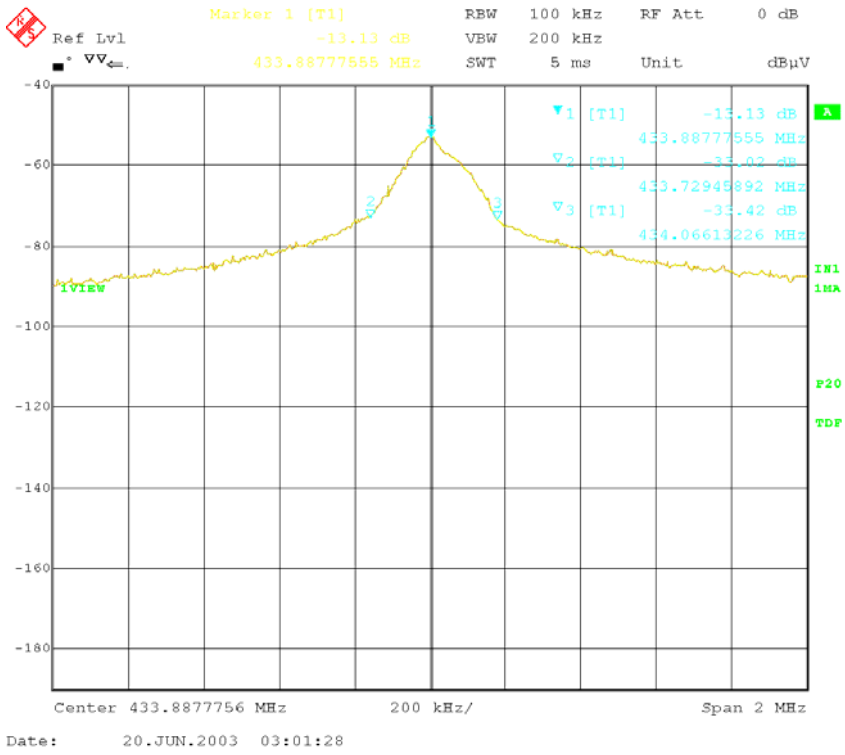
The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70MHz and below 900MHz. Bandwidth is determined at the points 20dB down from the modulated carrier.

B.W(20dBc) Limit = 0.25% x f (MHz) = 0.25% x 433.887MHz = 1.0847MHz

From the plot, the bandwidth is observed to be 58.917KHz, at 20dBc where the bandwidth limit is 1.0817MHz.

6. 7 Band Edge Test Result

Product	: Wireless Thermometer
Test Item	: Band Edge Data
Test Mode	: Normal Operation
Temperature	: 25 ℃
Humidity	: 56%RH



Note: (1) The field strength of any emissions which appear outside of this band shall not exceed the general radiated emission limits in Section 15.209.

(2) The average measurement was not performed when the peak measured data under the limit of average detection.

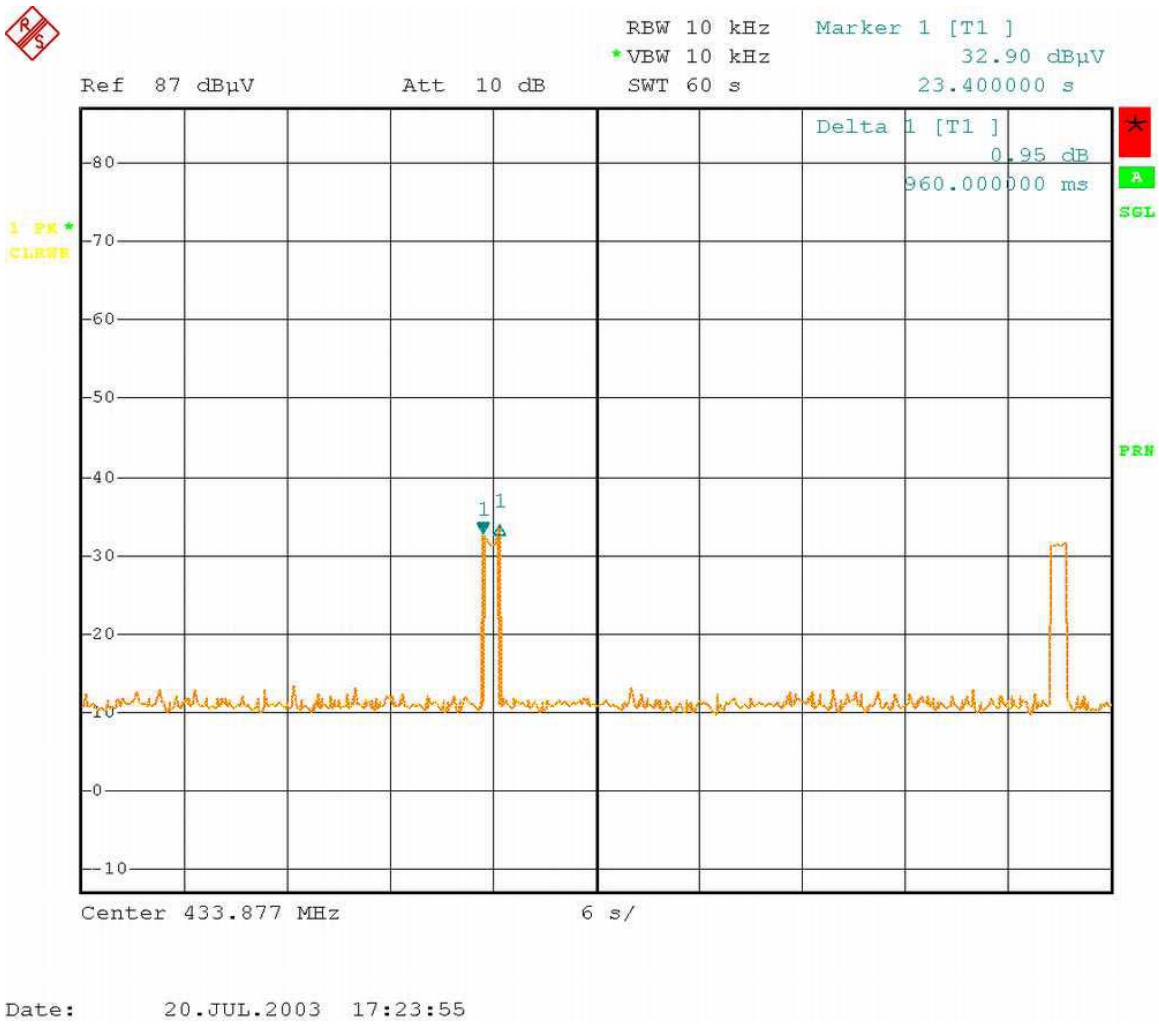
6. 8 Periodic Operation [FCC 47CFR 15.231e]

According to FCC 47CFR15.231e. The EUT shall be provided with a means for automatically limiting operation so that the duration of each transmission shall not be greater than one second and the silent period between transmission shall be at least 30 times the duration of the transmission but in no case less than 10 seconds.

Results:

Since the EUT of each transmission is 960msec, so the silent period must not less than 28.8 seconds (960msec x 30).

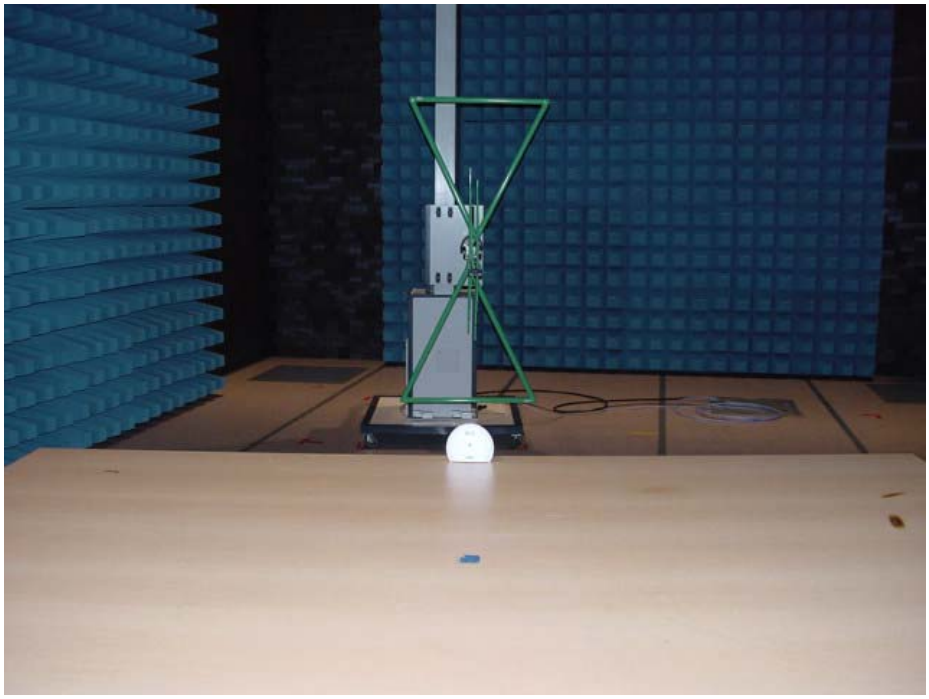
The following figures showed the duration of each transmission and silent period.



7. Photos of Testing

7. 1 EUT Test Photographs

Radiated emission test view



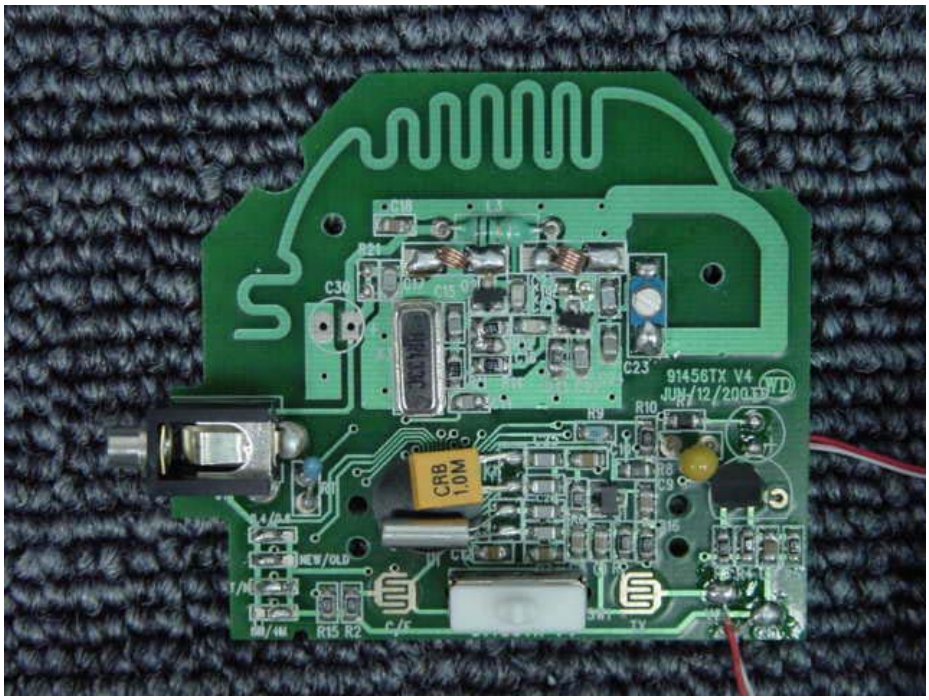
7. 2 EUT Detailed Photographs

(1) EUT top view

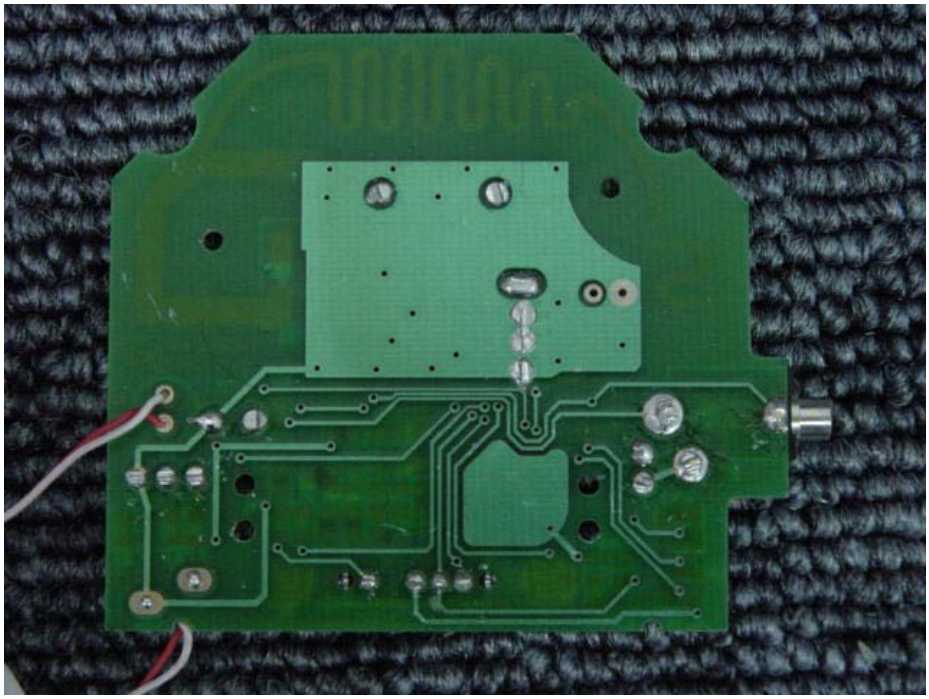
(2) EUT bottom view

(3) EUT inside whole view

(4) Main board component side



(5) Main board solder side



8. FCC ID Label

FCC ID: Q9E-91465

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

The Label must not be a stick-on paper label. The Label on these products must be permanently affixed to the product and readily visible at the time of purchase and must last the expected lifetime of the equipment not be readily detachable.

Proposed Label Location on EUT

EUT Bottom View/Proposed FCC Mark Location

9. Test Equipment

The following test equipments were used during the radiated & conducted emission test:

Equipment/ Facilities	Manufacturer	Model #	Serial No.	Date of Cal.	Due Date
EMI Test Receiver	Rohde & Schwarz	ESCS30	100003	Feb 27, 2003	Feb 27, 2004
AMN	Rohde & Schwarz	ESH3-Z5	100002	Feb 01, 2003	Feb 01, 2004
LISN	Kyoritsu	KNW-407	8-1441-8	Feb 23, 2003	Feb 23, 2004
EMI Test Receiver	Rohde & Schwarz	ESI26	838786/013	Feb 01, 2003	Feb 01, 2004
Bilog Antenna	Chase	CBL6112B	2591	Feb 01, 2003	Feb 01, 2004
Horn Antenna	Rohde & Schwarz	HF906	100014	Feb 01, 2003	Feb 01, 2004
3m Semi-Anechoic Chamber	Albatross Projects	9mX6mX6m	N/A	Feb 01, 2003	Feb 01, 2004